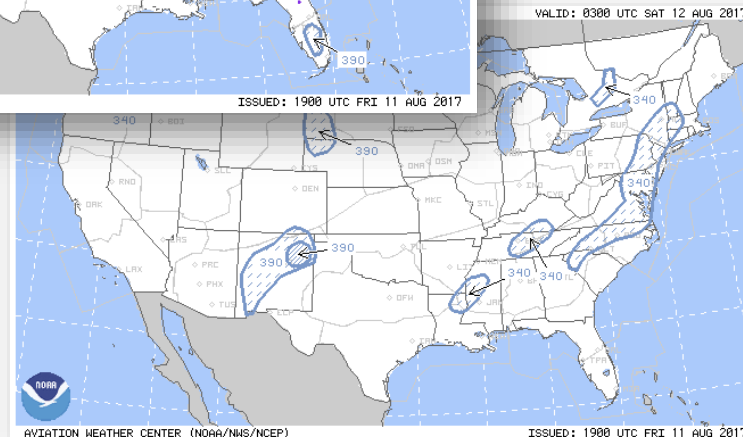
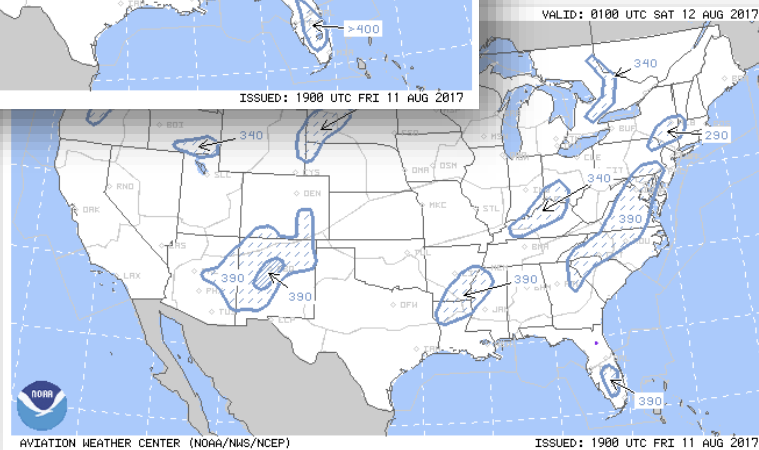
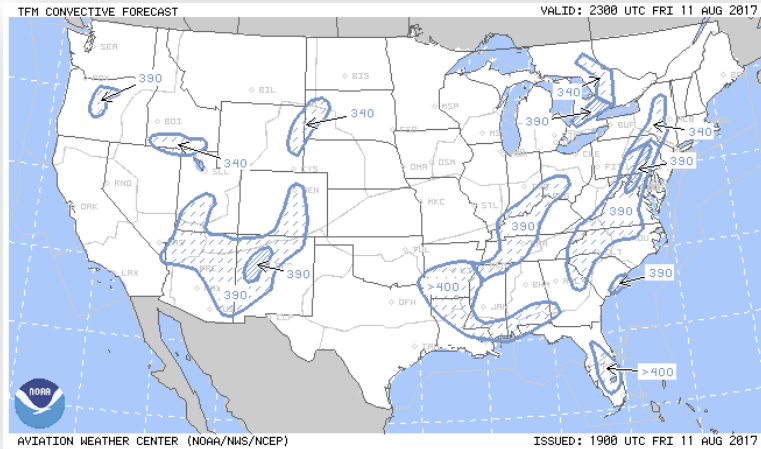




# **Traffic Flow Management Convective Forecast 2021**

**NOAA/NWS/Aviation Weather Center  
Kansas City, MO**

# 2021 TCF



- Issued 24x7, every 2 hrs
- Forecast for 4-6-8 hours
- High Confidence areas only
- Does NOT account for or depend on lightning
- Available on web, TSD and NOAAPort

# When is TCF Available



## AutoTCF

- Runs year round
- Is the official forecast during the off season (Nov-Feb)
- Available to meteorologists as first guess before collaborated product is issued

## Collaboration

- Seasonal (Mar-Oct)
- NWS & Industry collaborate every 2 hours to produce final
- Refines areas based on meteorologist assessments
- Final forecast may not look like autoTCF after collaboration

# The TCF

## Collaboration Forecast Process



### AWC TCF Meteorologist Role

- a) Analyze convective weather and produce preliminary forecast using autoTCF as a baseline
- b) Facilitate the collaboration in the whiteboard
  - Acknowledge requests
  - Provide meteorological reasoning when changes not made
- c) Produce TCF based on feedback from collaboration

### TCF Collaborators Role

- a) Prepare for collaboration by analyzing convective weather and reviewing the autoTCF
- b) Provide feedback during the collaboration in the whiteboard
  - Concurrence with preliminary forecast
  - Meteorological reasoning for requested changes
- c) Brief decision makers on TCF

# 2021 TCF Collaboration Schedule



***First Issuance: Monday 1 March 0130 CST***  
***Last Issuance: Friday 29 October 1730 CDT***  
***(Southern Ontario/Quebec: 1 Apr-30 Sep)***

30 minute Collaboration Sessions

---

Final Product issued 45 minutes prior to Strategic  
Planning Webinar



# TCF Production Cycle



		<b>Central Time CDT/CST</b>					
		autoTCF made available to NWS Collaborating Meteorologists	prelimTCF Issued/ Whiteboard Collaboration Start	Whiteboard Collaboration End/ finalTCF Edits Begin	AWC Shift Change	finalTCF Issued	Strategic Planning Webinar
	t- (min)	120	90	60		45	0
	<b>Central Time CDT/CST</b>						
	11Z/12Z TCF	4:15 AM	4:45 AM	5:15 AM		5:30 AM	6:15 AM
	13Z/14Z TCF		6:15 AM	6:45 AM	7:00 AM	7:30 AM	8:15 AM
	15Z/16Z TCF	8:15 AM	8:45 AM	9:15 AM		9:30 AM	10:15 AM
	17Z/18Z TCF	10:15 AM	10:45 AM	11:15 AM		11:30 AM	12:15 PM
	19Z/20Z TCF	12:15 PM	12:45 PM	1:15 PM		1:30 PM	2:15 PM
	21Z/22Z TCF		2:15 PM	2:45 PM	3:00 PM	3:30 PM	4:15 PM
	23Z/00Z TCF	4:15 PM	4:45 PM	5:15 PM		5:30 PM	6:15 PM
	01Z/02Z TCF	6:15 PM	6:45 PM	7:15 PM		7:30 PM	8:15 PM
	03Z/04Z TCF	8:15 PM	8:45 PM	9:15 PM		9:30 PM	
	05Z/06Z TCF		10:15 PM	10:45 PM	11:00 PM	11:30 PM	
	07Z/08Z TCF	12:15 AM	12:45 AM	1:15 AM		1:30 AM	
	09Z/10Z TCF	2:15 AM	2:45 AM	3:15 AM		3:30 AM	

PREVIEW

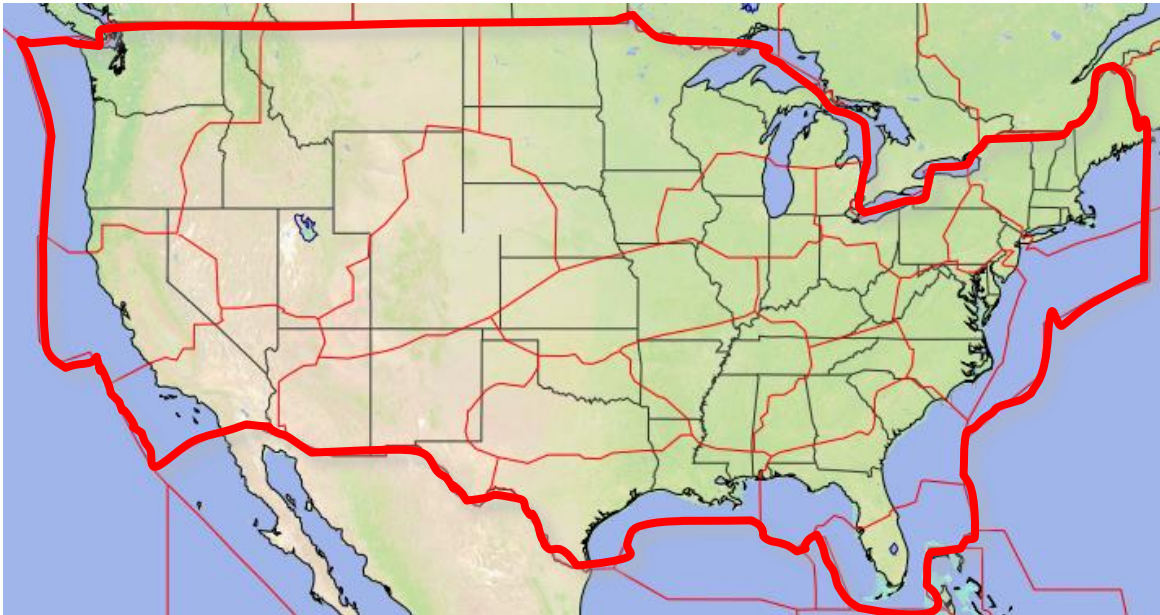
Web & PREVIEW

TCF & PREVIEW

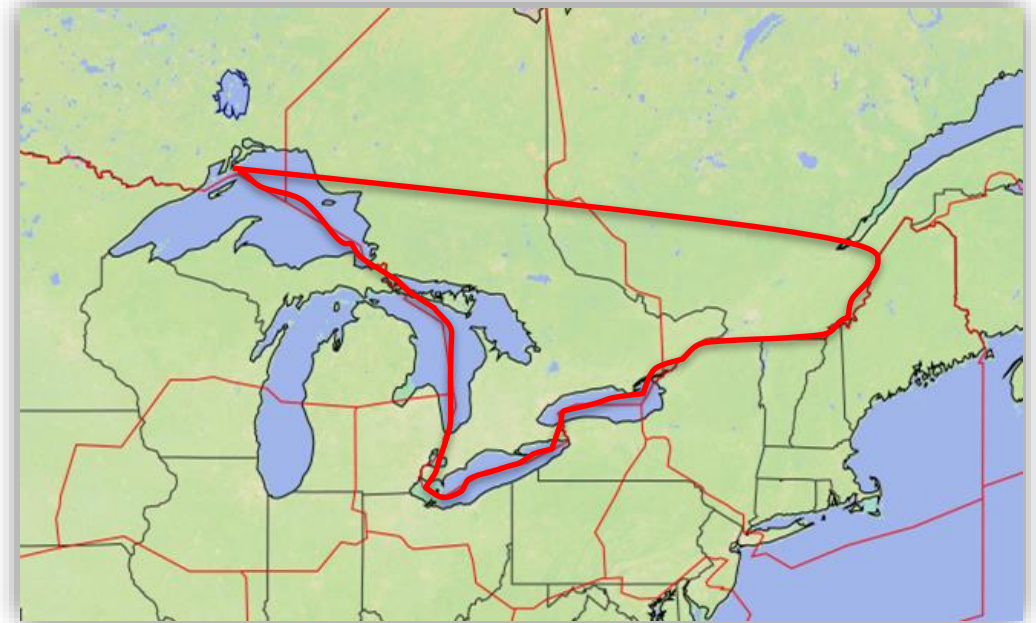
# TCF Domain



Covers the Domestic FIRs



\*Apr 1-Sep 30  
MSC area of responsibility



# TCF Minimum Criteria



## Areas of convection:

- Polygon coverage  $\geq 25\%$
- $\geq 40$  dBZ reflectivity
- Echo tops  $\geq$  FL250
- Highly confident this will occur

**Sparse 25-39% (broken hatching)**



**Medium 40-74% (solid hatching)**



## Solid Lines of convection:

- Linear coverage of  $\geq 75\%$
- $\geq 40$  dBZ reflectivity
- $\geq 100$  nautical miles in length
- Echo tops  $\geq$  FL250
- Highly confident this will occur

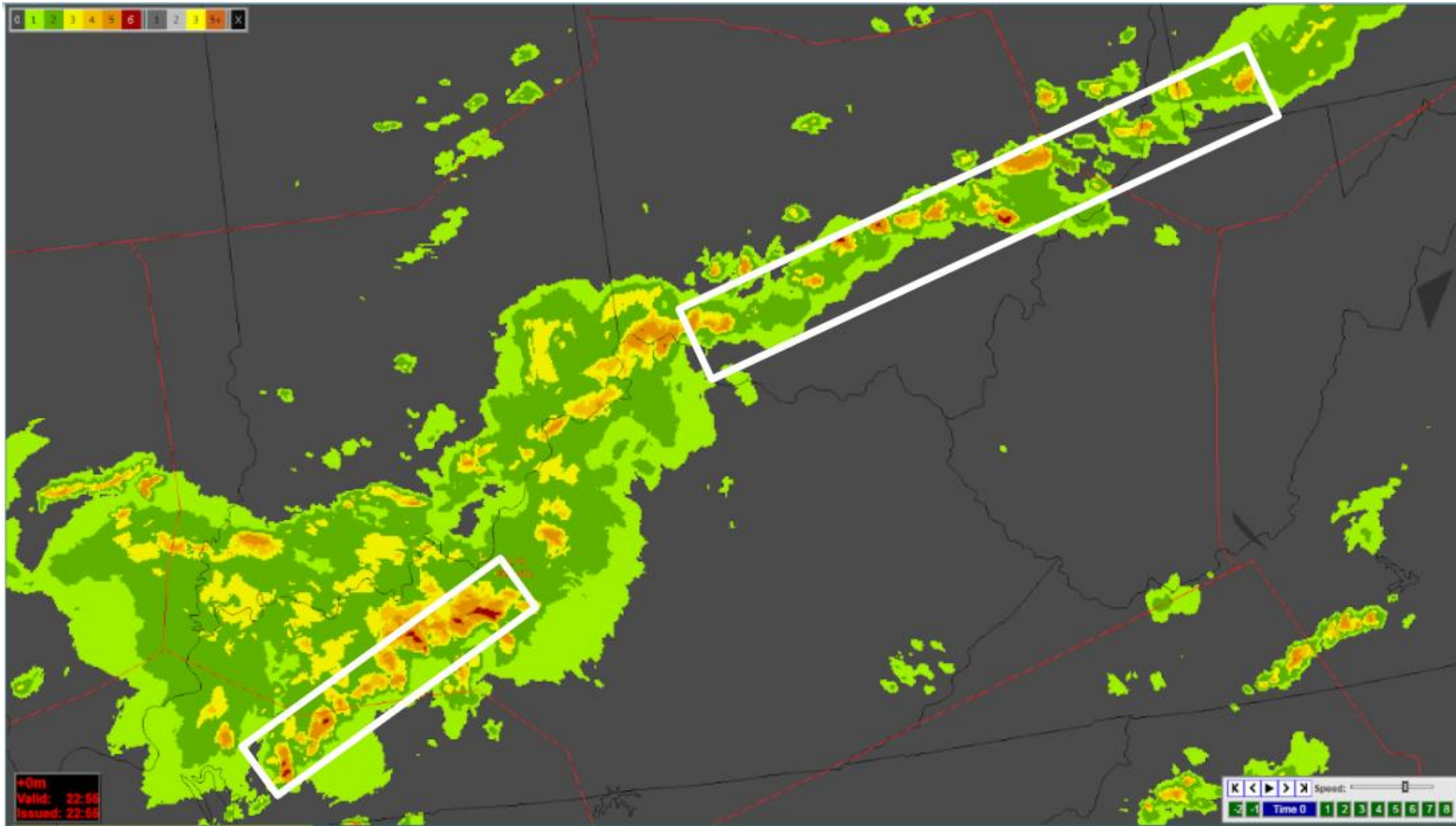
**Solid Line 75-100%**



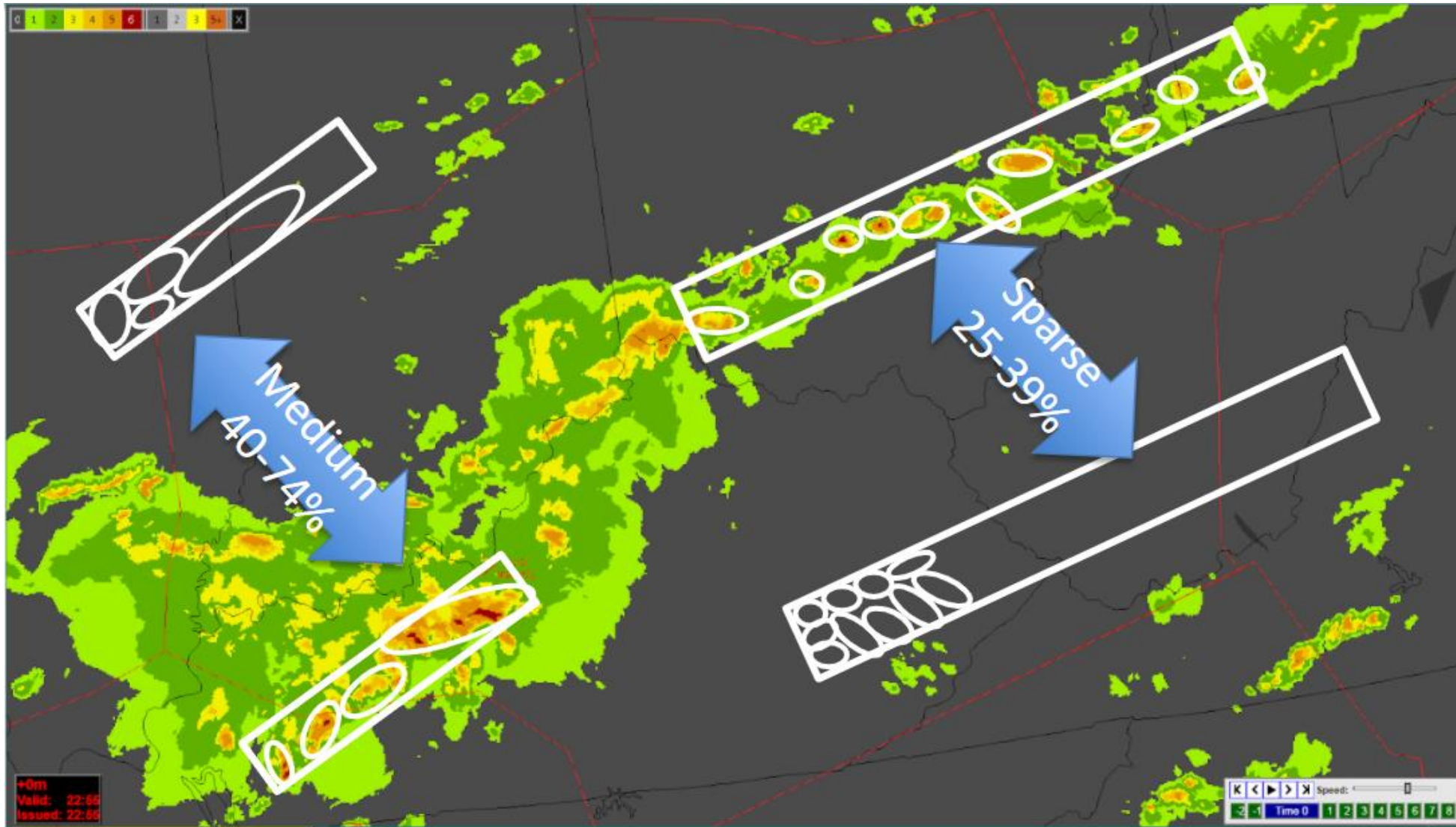
(Note: Lines can stand alone or be included within areas.)



# Is This Sparse or Medium?



# Is This Sparse or Medium?



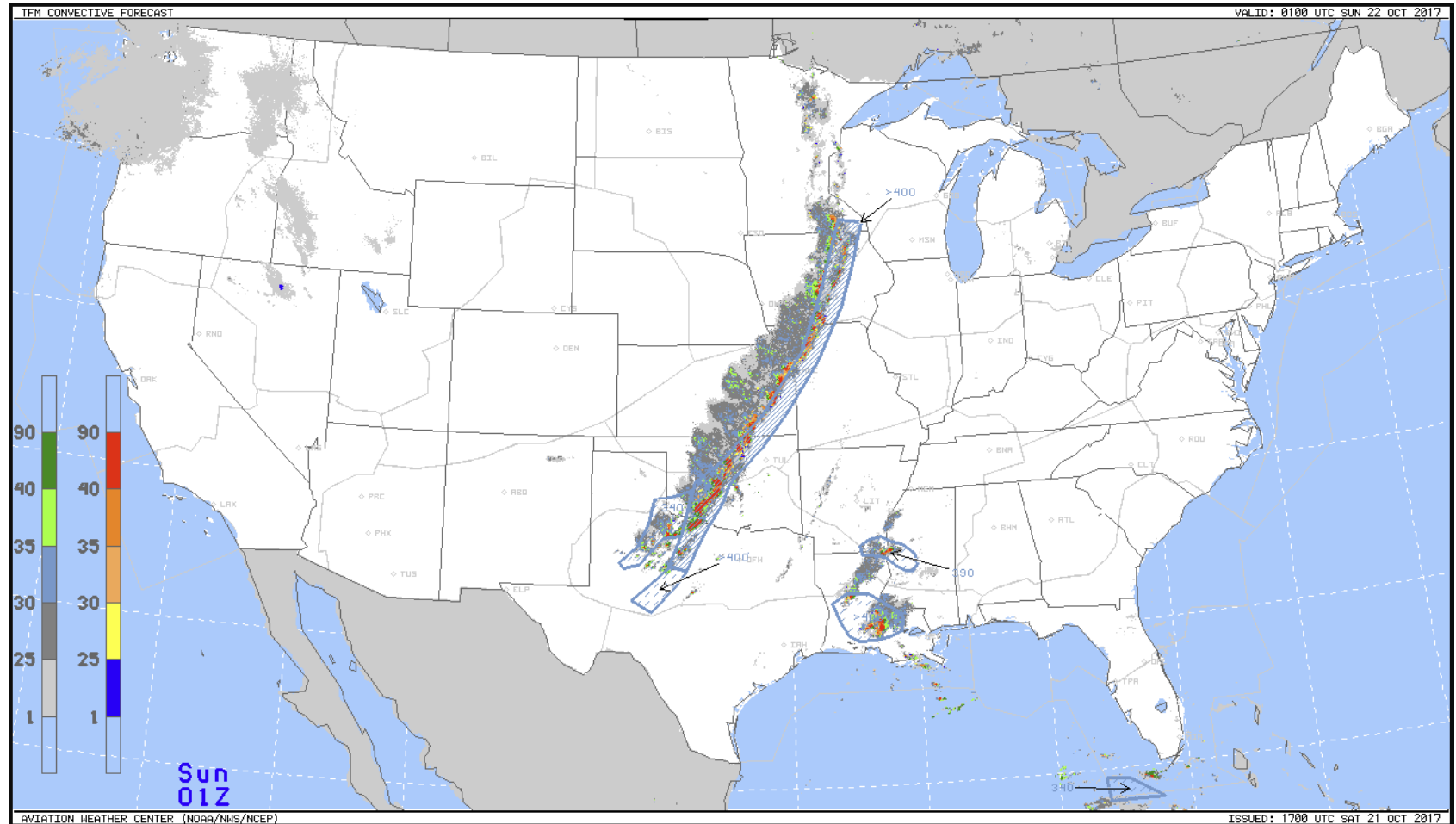
# TCF Medium vs Line



## Medium Coverage Polygon vs. Solid Line

Medium Coverage  
40-74% coverage

Solid Line  
≥75% coverage





# TCF Echo Tops



Labeled as follows, inside each area:

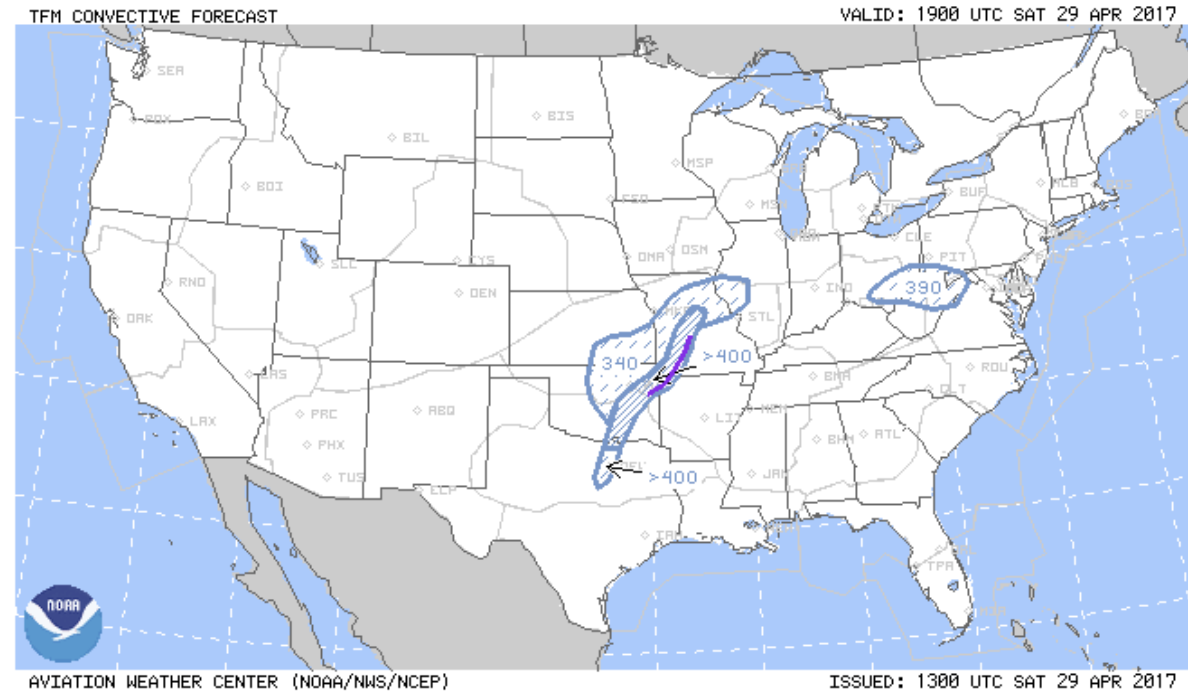
**25000→29000 MSL = “290”**

**30000→34000 MSL = “340”**

**35000→39000 MSL = “390”**

**40000+ MSL = “>400”**

(Note: Solid lines do not have an Echo Top label)








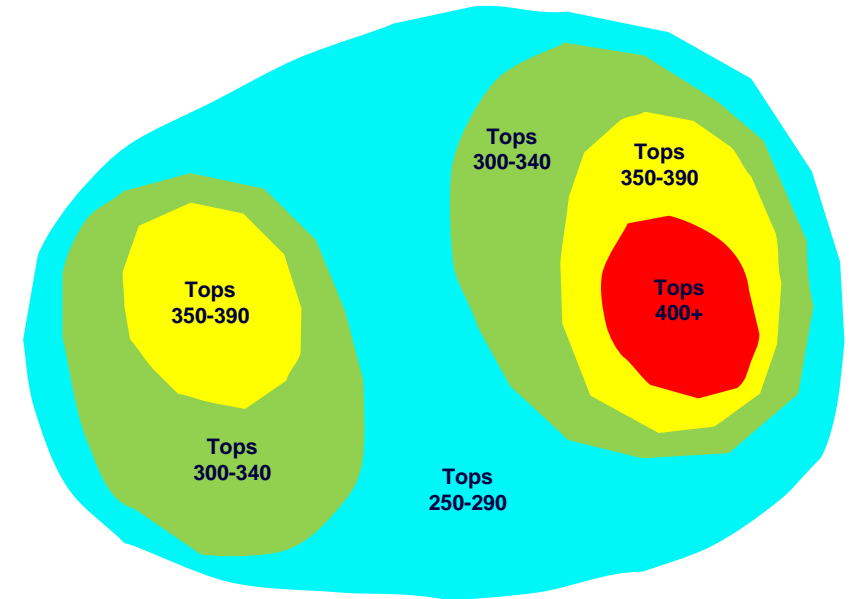
# TCF Echo Tops Example



For example... start at highest tops and work down

Height	Total Area
400+	10%
350-390	20%
<b>300-340</b>	<b>30%</b>
250-290	40%

 = 10% total area  
 = 20% total area  
 = 30% total area  
 = 40% total area



What is the first instance of  $\geq 25\%$  total area?

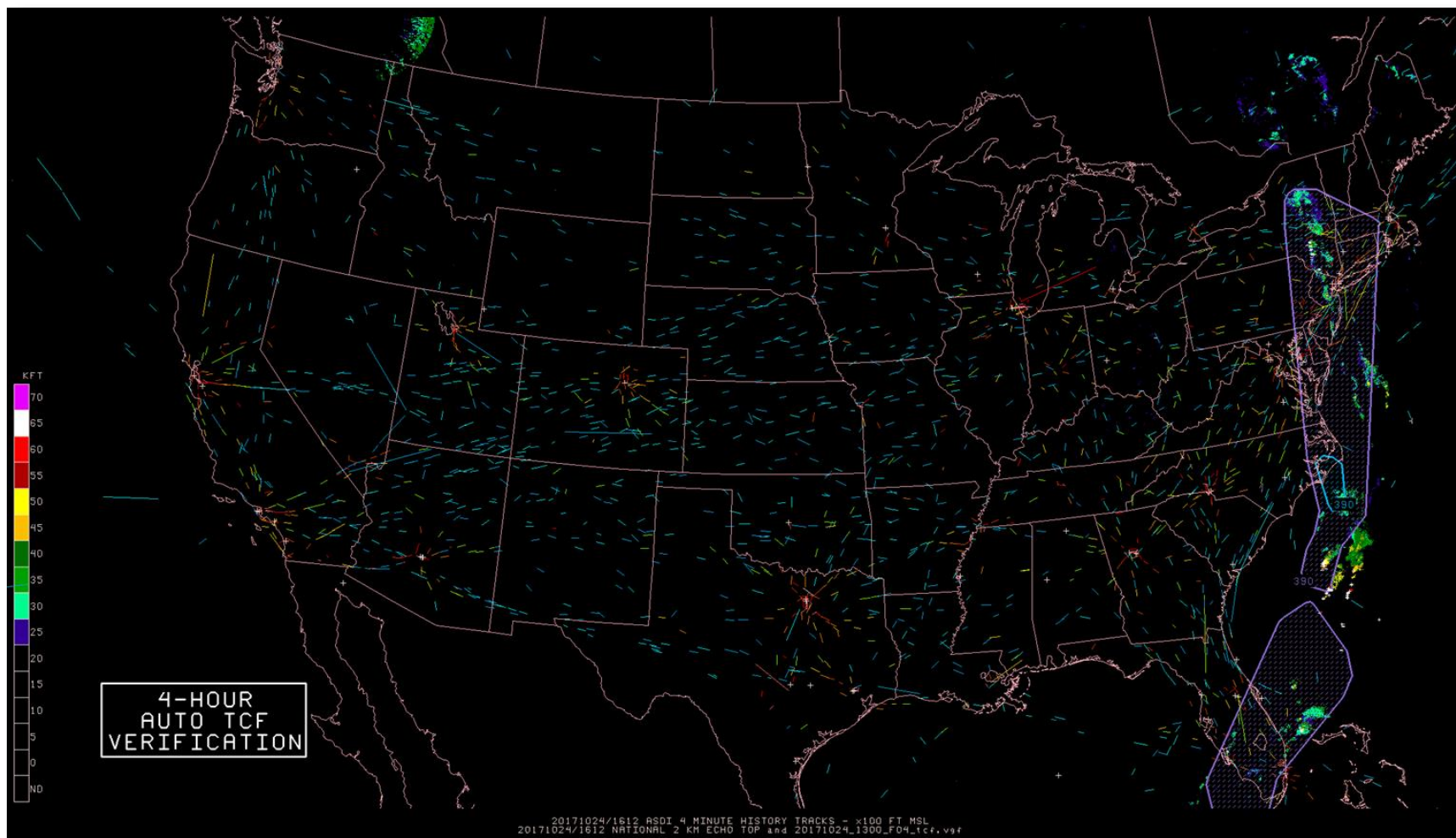
**Echo tops forecast is 340**  
(TCF tops are not MAX tops)

Per FAA feedback, **FL320** is a critical level for operations. Focus is given to this threshold while forecasting tops and during the collaboration sessions.

# TCF Impact Areas



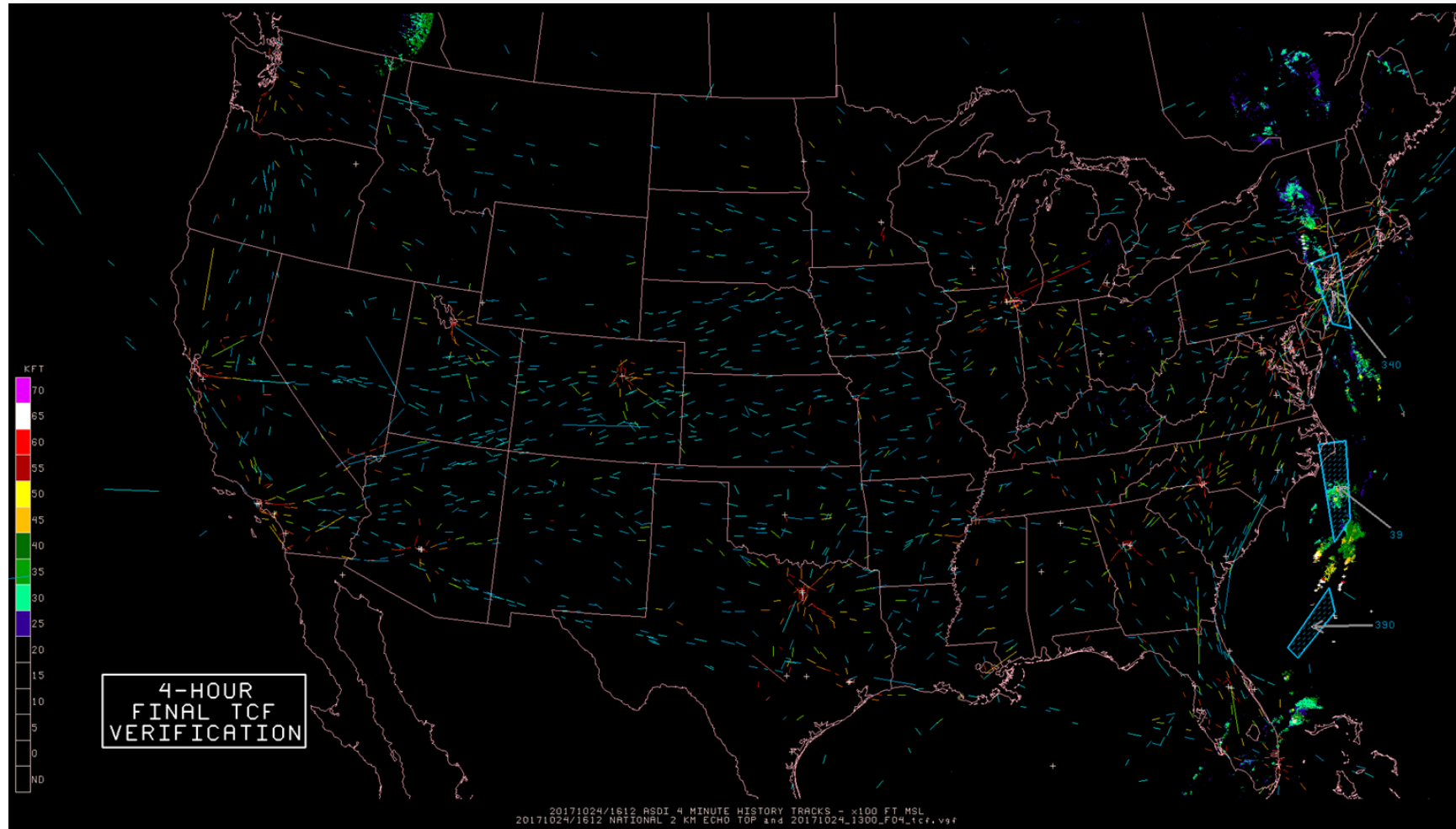
## Consider High Impact Areas (Auto)



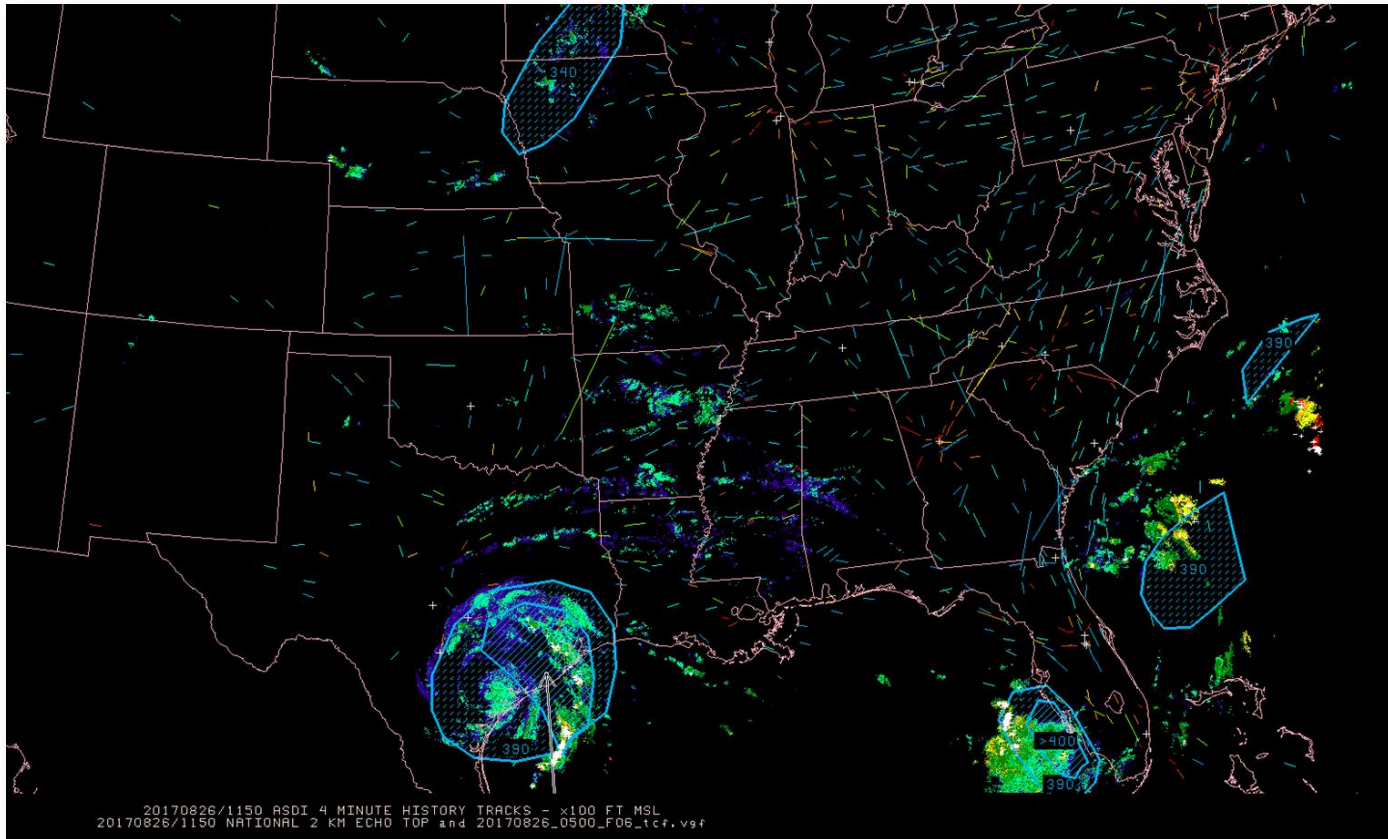
# TCF Impact Areas



## Consider High Impact Areas (Final)



# TCF Hurricane Coverage



- High Confidence Areas
- 40 dBZ or higher
- Tops  $\geq$  FL250

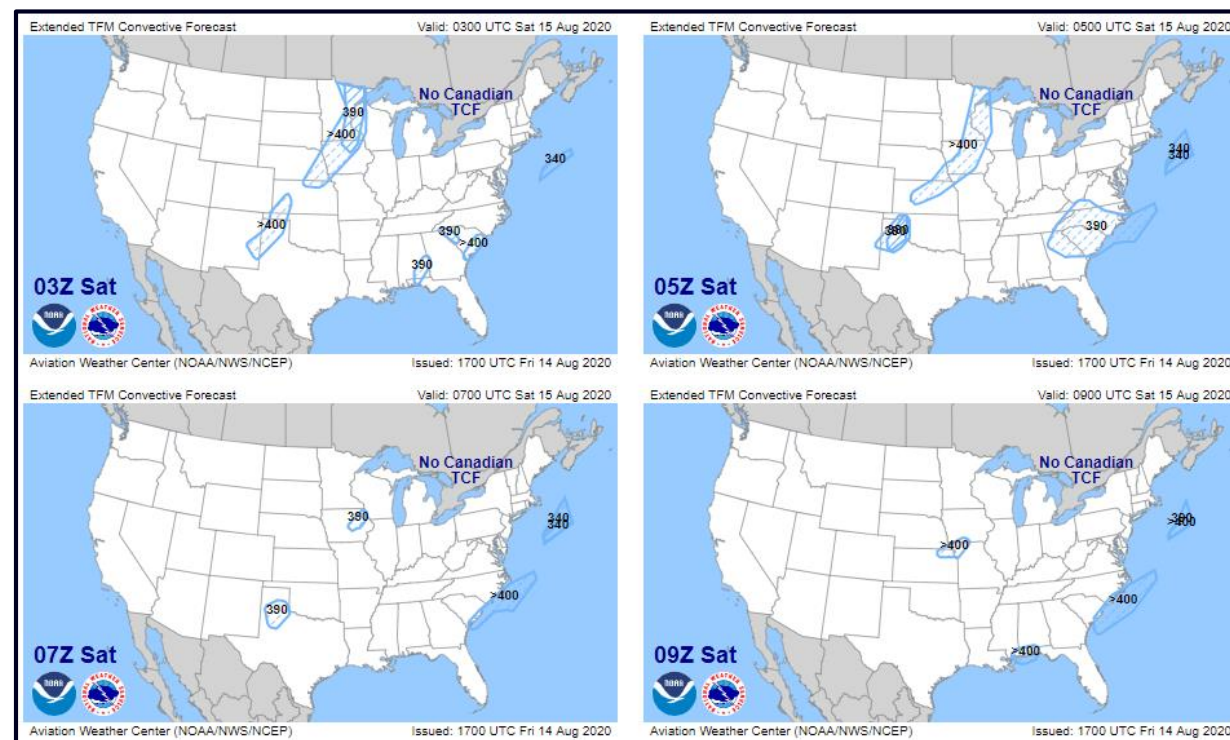
⇒ May result in only covering the outer bands



# Extended TCF (eTCF)



- Forecasts from 10 to 30 hours in 2 hour increments
- Similar look and feel to TCF
- Updated every 2 hours
  - Exception: No solid line!
- **Automated** product based on HRRR<sup>t-1</sup>, HRRR<sup>t-2</sup>, HRRR<sup>t-3</sup>, HiresWARW, HiresWARWm2

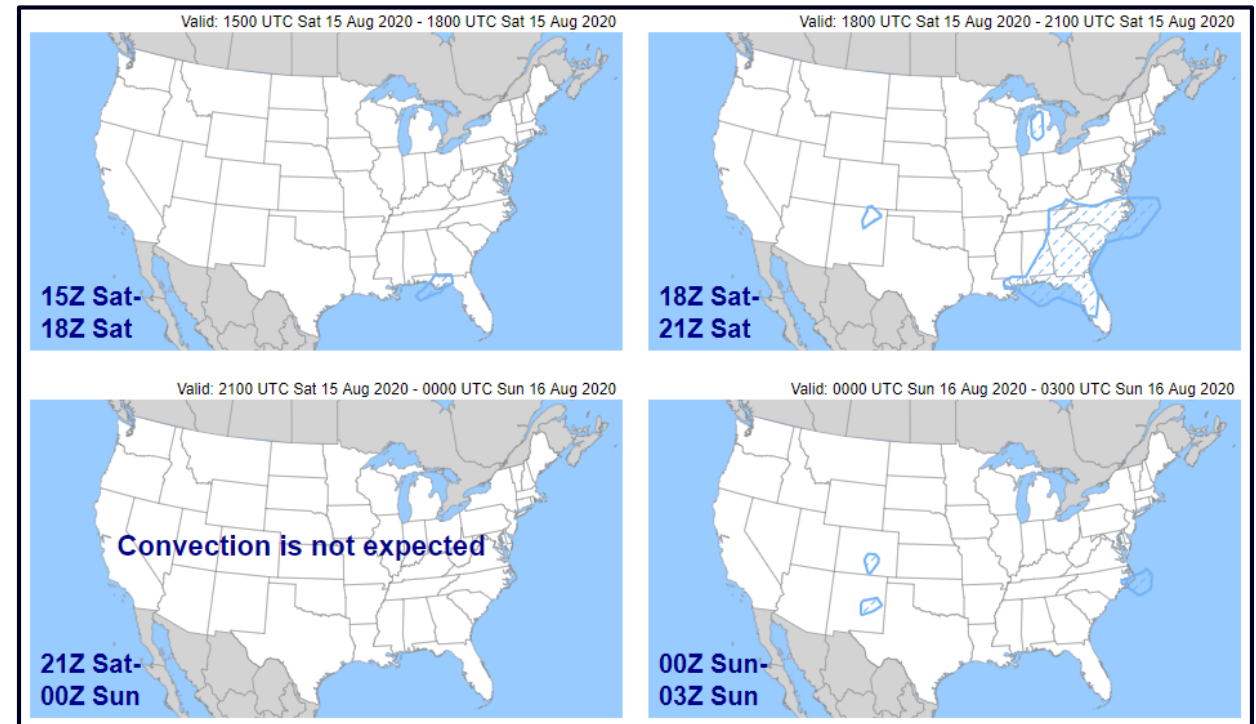


<https://aviationweather.gov/tcf/extended>

# Extended Convective Forecast Product (ECFP)



- Probability forecast from 33 to 72 hours
- Available in 3 hr increments
- Meant to compliment TCF, but is not the same as TCF
- **Automated** product based on SREF ensemble calibrated thunderstorm probabilities



<https://aviationweather.gov/ecfp>

# TCF Websites



## Main TCF Site

**<https://www.AviationWeather.gov/tcf>**

## Auto-TCF Preview Site

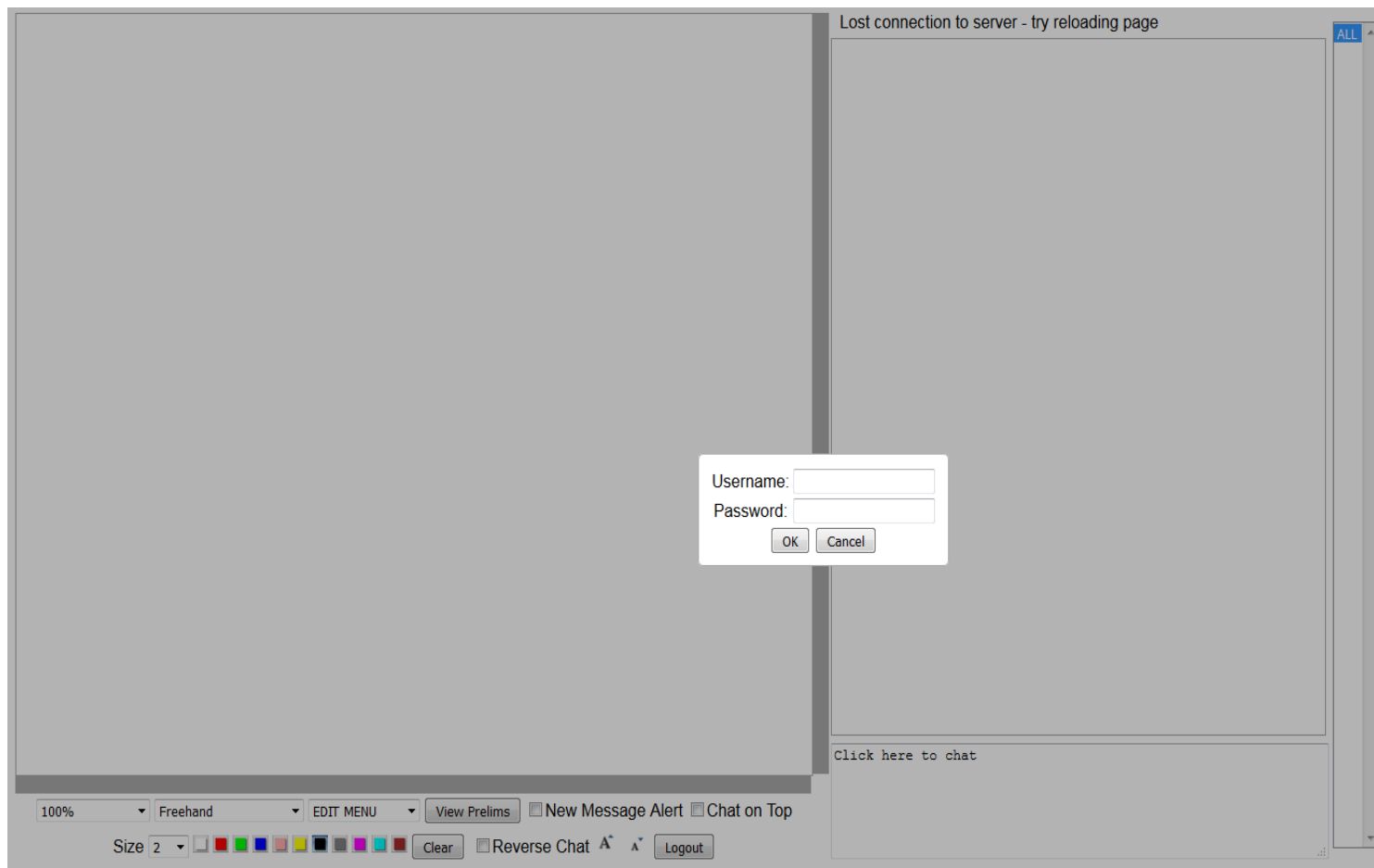
**<https://www.AviationWeather.gov/tcf/preview>**

**Restricted to users with AviationWeather.gov account**

# Whiteboard and Chat



<https://cdm.AviationWeather.gov/chat/tcf.html>





# Request a TCF Whiteboard Account



<https://goo.gl/forms/NSFyteeS9nzCR7ga2>

- Please fill out the form
  - Individual Accounts Only (Group accounts not allowed)
  - One email with username and another with password
  - This could take several days as it is a manual process for AWC's administrators
  - Your username will look like XXX-FirstinitialLastname (Example: AWC-JDoe)
- Call TCF Desk if you forget your password and need it retrieved (816-584-7269)
- For other chat issues, contact [ncep.awc.tcfchat@noaa.gov](mailto:ncep.awc.tcfchat@noaa.gov)

# Request an AviationWeather.gov Account



- Visit <https://www.aviationweather.gov>
- From the top menu select USER and then click Register
  - Please fill out the form
  - Username is your email address
  - Access to the auto-TCF preview and TCF verification could take several days as it is manually granted to people

(Note: the whiteboard is a separate system and different accounts are required)

# TCF Verification



## To view TCF Verification:

- Navigate to <https://www.aviationweather.gov/tcf>
- Scroll down and under Archived TCF Images, enter desired date and time cycle issuance. Click Retrieve.
- Click on one of the three panels

**AVIATION WEATHER CENTER**  
NOAA NATIONAL WEATHER SERVICE

Local Forecast  Go HOME ADVISORIES FORECASTS OBSERVATIONS TOOLS NEWS SEARCH ABOUT USER

**TFM Convective Forecast (TCF)** [TCF Home](#) [Plot](#) [eTCF](#) [Info](#)

Issuance:

4 hour forecast

6 hour forecast

8 hour forecast

COVERAGE		HEIGHT	
		TOPS: 100's OF FEET MSL	
SPARSE		25000 - 29000	290
25-39%		30000 - 34000	340
MEDIUM		35000 - 39000	390
40-74%		40000+	>400

**Archived TCF Images**

To view TCF images for a previous day, type in the date you wish to retrieve (e.g. 20170215 for February 15, 2017) or click the date field and select a day from the calendar control. Then select the TCF run from that day. Then click the "Retrieve" button. TCF images available since **February 15, 2017**. CCFP archive no longer available after February 15, 2017.

Date:  Time:

# TCF Verification



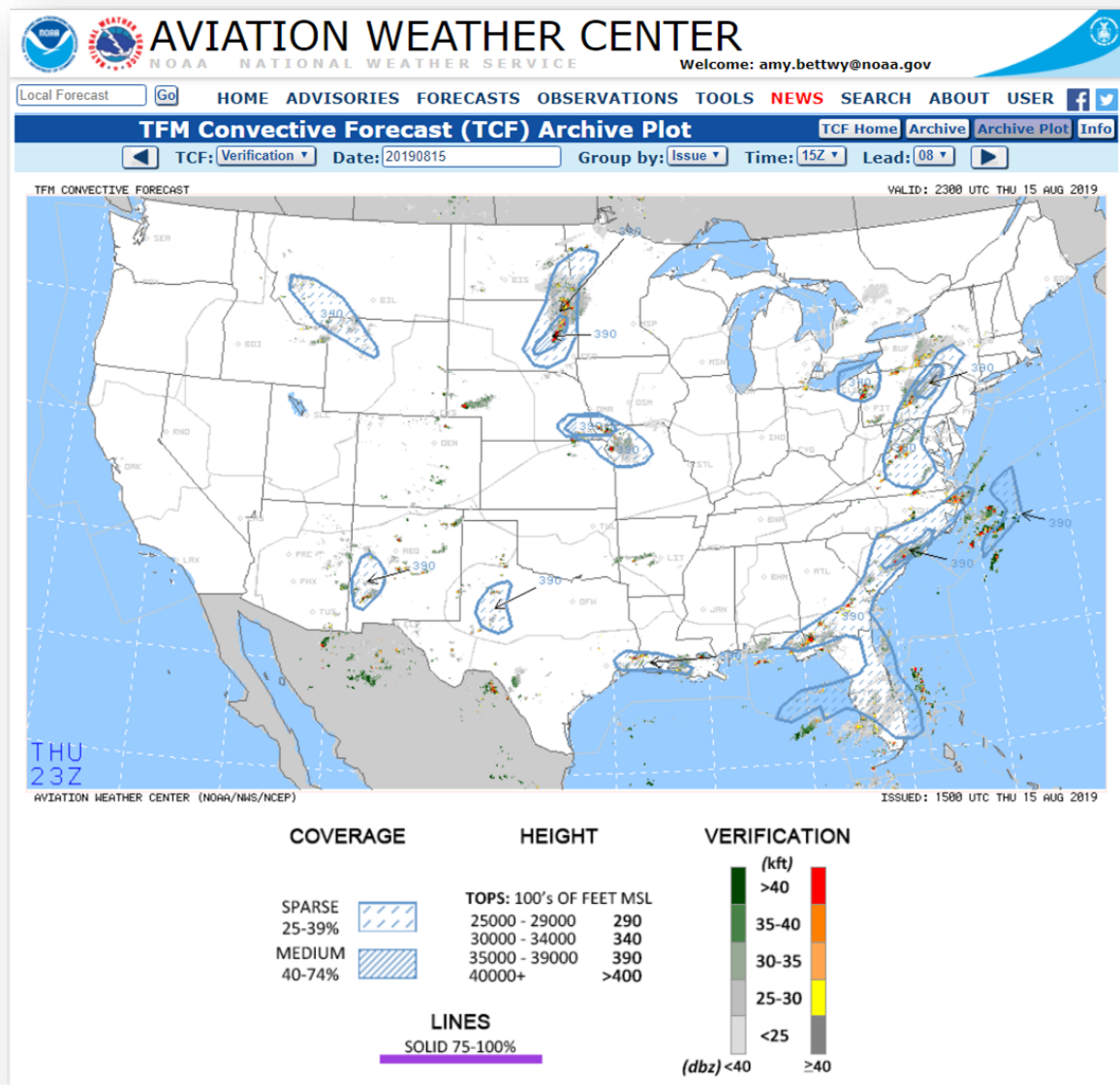
## To view TCF Verification:

- Select Verification on the Type drop down menu
- Select Group by Issue time or Valid time
- Use arrows to scroll through verification panels

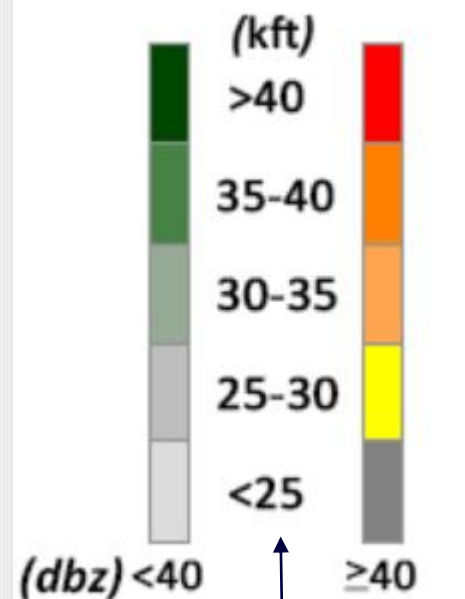




# TCF Verification



## VERIFICATION



echo tops

below 40 dbz

above 40 dbz

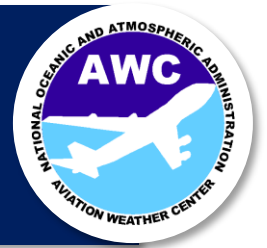
## Green or "Cool" Areas:

- Reached echo tops criteria but not 40 dbz criteria
- Does not verify polygons

## Yellow/Orange/Red or "Hot" Areas:

- Reached echo tops and 40dbz criteria
- Verifies polygons

# TCF Feedback Form



## TCF Review Feedback Form

- **Voluntary participation**
- **Encourages daily review of TCF and increases awareness of TCF performance**

<https://docs.google.com/forms/d/e/1FAIpQLScs94xkRzeK-atFeZpfq2Zida9Kh79mfnJjLMDsXsTogihFxdQ/viewform>



### TCF Feedback

AWC would like to hear from you! The purpose of this form is to gather meteorological reasons and any additional considerations as to how the forecast was developed. Please provide feedback on any TCF cycle and forecast hour.

Verification images are available on the TCF page and should be referenced when submitting your feedback.

#### How to Access Verification:

- Navigate to <https://www.aviationweather.gov/tcf>
- Select the date and cycle time from the calendar option at the bottom of the TCF page.
- Click "Retrieve"
- Click on the desired forecast hour image.
- Choose "Verification" from the TCF dropdown menu in the upper left corner.

Note: Verification images will be available after the 8-hour forecast time has passed (example: 15Z cycle verification is ready after 23Z).

Disclaimer: This form is strictly voluntary.

\* Required

Email Address

Your answer

Office (ex: AWC, United, FAA) \*

Your answer

# Questions/Discussion?



**For additional information, please contact**

**Jonathan Leffler**

**AWC Domestic Operations Branch Chief**

[jonathan.leffler@noaa.gov](mailto:jonathan.leffler@noaa.gov)

816-584-7239